Fracture of the anconeal process in two cats

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Summary
Two adult domestic Shorthair cats were presented with acute forelimb lameness. In one case, there was a history of trauma. A fracture of the anconeal process was diagnosed on the flexed mediolateral radiographs of the elbow in both cats. The fracture was accompanied by a bony avulsion of the tricipital tendon in one animal. Both cats underwent surgical removal of the fractured anconeal process. Follow-up radiographic evaluation was available for one cat six months after treatment; radiographs showed evidence of osteoarthritis. The long-term clinical outcome, based on owner telephone follow-up conducted four and nine years postoperatively, was considered to be satisfactory.

Case report

Two adult domestic Shorthair cats were presented with acute forelimb lameness. In one case, there was a history of trauma. A fracture of the anconeal process was previously mentioned in one cat, yet more detailed information and discussion regarding aetiology, diagnosis and treatment options were not given (3). In dogs, three cases have been reported, two of which were Boxers and one was a German shepherd (4–6). In two of these cases, the fractured anconeal process was thought to be a sequel to an un-united anconeal process, where the secondary ossification centre of the anconeal process failed to fuse with the ulna (4, 6). The un-united anconeal process is well-known in German Shepherds with an incidence rate of up to 30% (7). More recently, a remarkable decrease in the incidence of this disease to 1.1% was reported in a population of German Shepherd dogs investigated in France, but these results have some limitation as the examined dogs were pre-screened (8). This disease has not been reported in Boxer dogs or in cats.

The aim of this report is to describe and discuss the clinical presentation, diagnosis and treatment of anconeal process fractures in the cat. Outcome evaluation was based on radiographic and owner telephone follow-up.

Case history

Case 1

A five-year-old, spayed female, domestic Shorthair cat was presented with an acute onset of right forelimb lameness of two days duration. The owner was unaware of any antecedent trauma.

A weight-bearing right forelimb lameness, grade 2 out of 5, was noted on clinical examination. Pain was elicited on full extension of the right elbow, but flexion was only minimally painful. There was no discernable soft tissue swelling. The remainder of the clinical examination and routine haematology were unremarkable. A flexed mediolateral radiograph of the right elbow revealed a triangular-shaped mineral opacity craniodorsal to the anconeus (Fig. 1); this fragment was aligned with the anconeus but separated from it by a radiolucent line. A second ovoid mineral opacity was evident cranial to the humerus, which was interpreted as being an osteochondroma or a sesamoid bone within the tendon of origin of the supinator muscle. The presence of a similar, smooth-shaped fragment of bone on the radiographs of the contralateral elbow is supportive of a diagnosis of sesamoid bone. A cranio-caudal radiograph of the right elbow did not reveal any abnormalities.

General anaesthesia was induced intravenously (IV) with ketamine (10 mg/kg IV) and midazolam (0.1 mg/kg IV) and maintained with isoflurane. Perioperative analgesia was provided by a local infiltration of the brachial plexus using bupivacaine 0.5% (2 mg/kg). Cefazolin (22 mg/kg IV) was administered as a perioperative antibiotic.

A standard caudolateral approach to the elbow was performed, as described by Piermattei and Johnson (10). Small osteophytes were present at the insertion site of the joint capsule. Inspection of the anconeal process revealed a 2 mm bony fragment at the tip. The fragment was excised and the joint was copiously lavaged and closed in a standard manner. The removed fragment was submitted for histopathological examination, which confirmed the...

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a NarketanÒ: Vétoquimol AG, Ittigen/Bern, Switzerland
b DormicumÒ: Roche Pharma AG, Reinach, Switzerland
c IsoFloÒ: Abbot AG, Baar, Switzerland
d CarbostesinÒ: AstraZeneca, Zug, Switzerland
e KefinOÒ: Teva Pharma AG, Aesch, Switzerland
diagnosis of an acute fracture of the AP. Fibrous exudation with proliferation of fibroblasts and osteoblasts with osteoid formation were evident.

The cat was discharged the next day and exercise restriction was advised for four weeks. Postoperative analgesia consisted of buprenorphine (0.015 mg/kg IV/PO q6h) for two days and a single administration of meloxicam at 0.2 mg/kg IV. After discharge the dose of buprenorphine was continued orally every six hours for another day by the owner, a student of veterinary medicine.

At follow-up examinations, one and six months after surgery, neither lameness nor reduced range-of-motion of the joint was evident. Radiographs taken four weeks postoperatively showed minimal osteoarthritic changes at the tip of the anconeal process. Six months after surgery, moderate osteoarthritis was evident radiographically. At telephone follow-up performed four years post-operatively, the owner reported normal weight bearing and jumping.

Case 2

A three-year-old, spayed female, domestic Shorthair cat was presented for acute lameness following a fall from a height. The medical record from this case was incomplete and initial physical examination findings and haematology were not found.

Radiographic examination of the chest revealed a mild pneumothorax and cloudy shadowing of the peripheral parts of all lung lobes, consistent with pulmonary contusions. Abdominal radiographs were unremarkable. The flexed mediolateral radiograph of the left elbow revealed a fracture of the anconeal process close to the base of the process, as well as a suspected bony avulsion of the tricipital tendon at its insertion on the olecranon (Fig. 2a). The fractured anconeal process was not visible on the craniocaudal radiographic view (Fig. 2b).

Surgical excision of the fractured anconeal process was performed through a standard caudal approach after induction of general anaesthesia, as described in the first case. The tricipital tendon was sutured and anchored to the olecranon tuberosity through a bone tunnel (Fig. 3). A description of the exact suture technique used for tendon repair was not found in the medical records. Postoperative radiographs confirmed complete removal of the anconeal fragment and sufficient apposition of the avulsed bony fragment with the olecranon. Stabilisation of the forelimb after surgery was provided by a spica splint for two weeks. Information on postoperative analgesia was not available due to incomplete data. Healing and clinical performance were noted as satisfactory at bandage changes. Two weeks postoperatively, left hindlimb lameness due to a caudodorsal coxofemoral luxation of unknown cause was diagnosed. As acetabular damage of the cranio- and caudodorsal rim of the acetabulum together with loose bony fragments were present, a femoral head and neck excision was performed. Healing without any apparent complications was reported.
Further clinical and radiographic follow-up examinations were not performed because the owner had moved to a foreign country. Owner-based telephone follow-up revealed normal weight bearing without lameness or impaired ability to jump nine years postoperatively.

Discussion

Fracture of the anconeal process has been previously mentioned in one cat, but a more detailed description is not available (3). In dogs, major or minor trauma is reported as causes of anconeal fractures (4–6). One of the dogs previously reported was hit by a car; the other two dogs were suspected to have sustained minor trauma (4–6). In these dogs, an underlying condition consistent with an un-united anconeal process could not be excluded although signs of chronic degenerative joint disease were not evident on radiographs. Unlike the German Shepherd, a secondary centre of ossification of the anconeal process is not reported in the Boxer dog, and information on the nature of maturation of the anconeal process is not available for the cat. In one of the two cats presented herein, the anconeal process fracture was caused by a fall that additionally resulted in an avulsion of the tricipital tendon. The extreme loading of the cubital joint during landing and the flexion accompanied by rotation within the joint are suspected to have caused the fracture of the anconeal process. Trauma is considered very likely in the other case, in which histopathology confirmed an acute fracture of the anconeal process. Fracture of the anconeal process is also known to occur in swine. Histopathological examination carried out on the elbow joints of five pigs revealed findings that were similar to those in case one, in addition to formation of hyaline- and fibrocartilage as well as a buttress callus (11). Underlying causes proposed for the porcine anconeal process fractures were acute traumatic incidents, repetitive traumas and osteochondrosis of the elbow joint. Considering the available data, we believe that trauma is necessary to fracture the anconeal process in cats, however further investigation of the maturation process of the feline anconeal process would be interesting.

The diagnosis of anconeal process fracture can be made following physical and radiographic examination. The injured elbow may be painful on palpation and soft tissue swelling may be present. In the first case described herein, extension of the elbow was most likely extremely painful, although flexion did not elicit signs of pain. Crepitus, joint effusion and soft tissue swelling were not evident. These findings were consistent with those previously described in dogs. Additional findings in dogs were signs of pain on rotation of the antebrachium, crepitation, joint filling and soft tissue swelling (4, 5). Assuming trauma to be the most common cause of anconeal process fractures, careful physical examination to look for other trauma-related injuries is prudent. Given that superimposition of the humeral condyles may obscure a direct view of the anconeal process in standard mediolateral radiographs, a radiographic diagnosis in cats is best made using a flexed mediolateral view as reported in dogs (12). If injury is confined to the anconeal process, the fracture is not visible on craniocaudal views, as was the case in these two cats.

Treatment options in dogs with an un-united anconeal process include fragment excision, lag-screw fixation, proximal ulnar osteotomy and a combination of the latter (13). Conservative management as well as excision of an un-united anconeal process, result in progressive lameness and osteoarthritis, so these treatments are not recommended (14). Nevertheless there is little evidence available that other surgical methods, such as the repair of anconeal process fractures or internal fixation of un-united anconeal processes, have a better clinical outcome and that radiographic signs of osteoarthritis have to be expected. Removal of the fractured fragment was performed in both Boxers with anconeal process fractures (4, 5). Lag screw fixation, which is feasible for larger fragments, was performed in the German Shepherd (6). Considering the small size of the fracture fragments seen in both of our cases, fixation was not attempted and excision was performed. Conservative treatment was not considered because, as proven for the dog, the fragment would continuously act as joint mouse, causing persistent joint inflammation, which leads to osteoarthritis, pain and a poor functional outcome.

Radiographic changes consistent with osteoarthritis are likely to develop despite surgical therapy, as was seen in the first case with a six-month radiographic follow-up and is likely for the second cat. The assessment of clinical outcome in our cases is limited to owner evaluation, in which both reported normal weight bearing, jumping and limb function. Despite the limited follow-up evaluation, the outcome in these two cases suggest that surgical excision of a fractured anconeal process in the cat might be appropriate in other cases.

References


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